

Calibration Report: Multifilter Rotating Shadowband Radiometer, MFR-7, s/n 379

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SUMMARY

Calibration date: 27 Oct 1999. Next calibration due: 27 Oct 2001

An analysis of clear sky data from a multifilter shadowband radiometer has been completed. A Harrison Objective Algorithm Langley Analysis was applied to the data sets. The resulting values are total optical thickness, t , top-of-atmosphere voltage (corrected for Earth-sun distance), $AUVo$, and the regression deviation for each of the 5 sensor channels. Each of these factors is a mean of the sum of the days yielding Harrison Objective Algorithm-Langley Regression outputs. These data were collected on the Chesapeake Bay Lighthouse in the Chesapeake Bay from 26 July to 27 Oct 1999.

Serial Number: MFR-7 379

Channel, nm	t	$AUVo$	dev	n	U95
416	0.37478	2311.5933	4.8171E-3	7	9.6342E-3
497	0.20971	1455.9579	3.8846E-3	13	7.7692E-3
613	0.13965	1486.8023	2.8625E-3	16	5.7250E-3
672	0.09489	2564.6163	2.5153E-3	13	5.0506E-3
868	0.09042	2331.7892	3.4250E-3	4	6.8500E-3

Application:

$$t_T = - \left[\frac{\ln(V) - \ln(AUVo)}{m} \right] \quad +/- \text{U95}$$

Where: Where: V = Sensor output, voltage counts.

t_T = Total optical thickness, calibrated.

m = air mass.

t = Slope from regression.

$AUVo = Vo(\text{Earth-sun distance, DU})^2$, solar constant estimate.

dev = The standard deviation of the residual variance from the data to the regression line of the $\ln(\text{voltage output})$.

n = The number of morning or afternoon Langley Regressions.

$\text{U95} = \text{sqrt}(2 \text{ dev}^2)$

